

Psychoses in Childhood—A Comparative Study*

ISRAEL KOLVIN

Hospital for Sick Children, Newcastle upon Tyne

Introduction

The neglect (Kanner, 1958) of the crucial operation of differential diagnosis by certain dynamically oriented writers (Szurek, 1956) has confounded the subject of classification of childhood psychosis. It has also facilitated the emergence of concepts of 'equality of schizophrenias' (Darr and Worden, 1951) and a unitary psychosis of childhood. The evidence in favour of this type of concept is scanty. Indeed in 1961 after weighing up the empirical, etiological and phenomenological evidence it was clear that there was no one piece of research which had attempted to deal with this issue in a global and comprehensive manner. This was our starting point.

Methodology

The basic ontological hypothesis (Kolvin, 1971a) to be tested was that—'Psychotic disorders in childhood are dependent on the age at which the process begins. Disorders with different ages of onset are fundamentally different.'

The present research began in 1962 and started with a three-fold objective:

1. To test the main hypothesis outlined.
2. To delineate statistically the distribution of symptomatology in childhood psychoses, especially late onset psychosis about which so little is known.
3. To establish criteria for the diagnosis of later onset childhood

* This paper summarises the findings of a series of joint papers. The various contributors included Israel Kolvin, Christopher Ounsted, Linda Richardson, Jane S. H. Kidd, Roger F. Garside, Angus McNay, Michael Humphrey, and Martin Roth.

psychosis on a statistical basis according to frequency analysis rather than clinical impressions.

Methodologically there were two logical steps:

I. To seek out a sensible preliminary clinical classification of childhood psychosis.

II. To evolve ascertainment criteria for these psychotic groups.

We were particularly impressed by Anthony's classification (1958a, 1958b and 1962), which combined eminent names with clinical features in relation to age. We modelled our study on his classification, dividing the childhood psychoses into three groups according to age of onset: those beginning before the age of three years, those between the age of three and five and those beginning after the age of five years. In addition to age of onset some other criteria had to be arrived at. Those for the infantile psychotic group (IP) are summarised in Table 1.

TABLE 1

Ascertainment Criteria for Infantile Psychosis

1. Age of onset before the age of three years.
2. A self-isolating pattern of social behaviour.
3. At least one of the following:
 - (a) Catastrophic reactions to environmental changes, particularly of a topographical variety.
 - (b) Gross stereotypies either of a global class such as head-banging, pinouetting or rocking; or of the idiosyncratic type, such as finger flicking, specific motor patterns, and self-stimulation.

Criteria for late onset psychosis (LOP) proved to be more difficult to obtain. We believed that studies should be based on objective, unambiguous and non-inferential ascertainment features which could be readily and reliably assessed. Bender's criteria (1947) consisted of onset before the age of 11 and pathology at every level of integration and patterning within the central nervous system, whether it is vegetative, motor, perceptual, intellectual and social. Like Eisenberg (1957) we concluded that this was too broad a basis for ascertainment of a circumscribed syndrome.

Kanner (1957) and Potter (1933) directed our attention to the diagnostic criteria so usefully employed in adult schizophrenia. Nevertheless, we remained fully aware of their limitations. In this respect Fish's amplification of the continental work (1962) proved particularly useful and led to the adoption of the criteria designated in Table 2.

In our clinical experience the psychoses between the age of three

TABLE 2

Ascertainment Criteria for Late Onset Psychosis

1. Onset during the main school period of five to fifteen years.
2. Adult schizophrenic symptoms of the first rank (Schneider).
3. Other adult schizophrenic symptoms in the fields of affect, motility and volition.

and five were relatively scarce. We were therefore left with the two main psychotic groups, infantile psychoses and late onset psychoses. We then expanded our main hypothesis in terms of three other subordinate hypotheses.

I. That the two main childhood psychoses (infantile psychoses and late onset psychoses) differ in etiology and phenomenology.

II. That infantile psychotic children when reaching the age at which late onset psychosis begins show different symptoms.

III. That if late onset psychosis is related to adult schizophrenia similar etiological patterns should be operative.

This study is, in essence, a comparative one of the two main psychoses of childhood. Comparisons were undertaken of:

- (a) Family and social background (Kolvin *et al.*, 1971c).
- (b) Parental personalities and attitudes (Kolvin *et al.*, 1971d).
- (c) Evidence of cerebral dysfunction (Kolvin *et al.*, 1971e).
- (d) Phenomenology and cognitive factors (Kolvin *et al.*, 1971b and f).

This paper contains only a sample of our salient findings.

To allow for symptomatic changes with development we sought past or present features reminiscent of the other psychoses (LOP or IP). This was necessary to avoid the risk that findings could simply reflect ascertainment criteria—the fallacy of circularity.

Age of Recognition

The distribution of age (Table 3) of recognition of the three groups of childhood psychoses is unequivocally bimodal. There are two main peaks—one just before the age of two years and the other about puberty. There were only three cases with an age of onset between the age of three and five. One of these was a rapidly developing degenerative disorder. The second was considered psychotic but not autistic because of relatively warm contact with adults. The other was a complex psychotic condition with a clear-cut organic history and features. Late onset psychosis was relatively infrequent before the age

TABLE 3

Age of Recognition

Group	Age (yrs)	Totals
IP	0-0.11	25
	1-1.11	19
	2-2.11	3
LOP	3-4.11	3
	5-6.11	1
	7-8.11	9
	9-10.11	4
	11-12.11	10
	13-15	9

of seven. The low frequency in the 15+ age range was probably due to a number of factors, especially paucity of adolescent psychiatric services with older adolescents passing to adult services.

It is important to note that the survey of two hospital populations both serving wide areas of the industrial Midlands and the North East produced only 47 cases of infantile psychosis and 33 cases of late onset psychosis. Lotter (1966 and 1967) in his epidemiological study produced a figure of 4.5 of 10,000 of the child population for autistic disorders. If the technique of comparing frequencies of different groups of hospital patients is reasonably valid and provided we exclude the older age group which might overlap with adult psychiatry, the conclusion must be that late onset psychoses occurring before the age of puberty are even rarer than infantile psychotics.

Social Class

A number of authors (Kanner, 1943; Creak and Ini, 1960; Rutter and Lockyer, 1967; and Lotter, 1967) have now demonstrated an excess of professional parents in their studies of autistic children.

In our series (Table 4) there is a similar excess of professional parents in the infantile psychotic group but the excess is lower than among the other two hospital series quoted above. In contrast is the excess of parents with unskilled or semiskilled manual jobs in those of later onset. It is unlikely that the excess of parents of childhood psychotics of later onset falling in the lower social classes is a referral artifact, though this cannot be ruled out without additional

TABLE 4

Social and Family Data

	IP	LOP	Significance
Social class	Excess I and II (39.5%)	Excess IV and V (47%)	*
Parental schizophrenia	± 1 parent	6 parents	*
Mothers' MPI mean 'N' score	17.88	23.35	NS
Mothers' MPI mean 'E' score	26.23	20.45	*

**p* = 0.05

epidemiological study. Evidence in support of this finding comes from Anthony (1962) who indicated, without actually providing figures, that his secondary psychosis group were predominantly from social class three and four. The data, therefore, seem to suggest that the different childhood psychoses are social class tied phenomena.

Language Environment of the Children

None of the 33 sets of parents of late onset psychotic children was born outside the United Kingdom, nor were there any homes in which a language other than English was spoken. Among the 47 families of infantile psychotic children there were seven in whom a 'foreign language' was spoken to a greater or lesser extent. It can be argued that this special group is a referral artifact. Nevertheless the authors think it provides possible clues to the etiology of infantile psychosis. It has been argued by Rutter (1965 and 1966) that autism may be a disorder which is, in part, determined by language defects similar to those in developmental receptive aphasia, and Hermelin and O'Connor (1964) have demonstrated both perception abnormalities and defects of coding and categorising verbally presented material.

If a child has a defect in the organisation and coding of auditorily perceived stimuli he may have greater difficulty in processing language using two completely different sets of symbolic bases. One could, therefore, hypothesise that the child who is vulnerable to 'autistic retreat' secondary to sensory confusion will do so with great facility when exposed to two completely different language systems. It is also reasonable to hypothesise the greater the use of abstract language, as occurs in upper class families, the greater the above mentioned processing difficulties.

Mental Illness in Family

In none of the authenticated series so far has there been any evidence of a raised incidence of psychosis in the parents of autistic children. In this study attempts were made to determine cases of schizophrenia among the parents and siblings of psychotic children by carefully checking hospital records to substantiate the diagnosis. The low rate of schizophrenia amongst parents and siblings of psychoses of early onset is again confirmed with only one parent having a schizo-affective disorder which eventually remitted after ECT and phenothiazine therapy. In contrast to this there is a substantial level of schizophrenia in the parents of the late onset psychosis group. Out of the thirty-two couples there was evidence of schizophrenia in six individuals. The parental schizophrenia rate is 9.4% without correction and 11.7% corrected (Weinberg's Formula). These figures closely resemble those provided by Kallmann and Roth (1956) both for the parental schizophrenia rate of pre-adolescent schizophrenia (8.8% without correction and 12.5% corrected) and the parents of adult schizophrenic twins (9.2% and 10.3%) and also for parents of adult singleton schizophrenics.

It would therefore appear that psychoses of childhood of late onset genetically resemble adult schizophrenia while infantile psychotics genetically bear no relationship either to psychoses of later onset or to adult schizophrenia. The absence of autistic siblings of infantile psychotic children is also noted. On the other hand one of the siblings of the group of late onset psychosis children developed schizophrenia in early adulthood.

Sex Ratio

The sex distribution of autistic children has consistently shown a high male/female ratio. This was again found in this series with 3.3 males to 1 female. Among the late onset psychotics the ratio was no different, being 2.7 males to 1 female.

Parental Personality and Attitude in Childhood Psychoses

Kanner and Eisenberg have described the parents of autistic children as being obsessive and cold personalities with limited genuine interest in people, so showing 'emotional frigidity'. From their personality descriptions these authors have also proposed a psychogenic hypothesis which ascribed, in part at least, causative significance to parental

personality and attitude factors. Others have extended this hypothesis and suggest that the psychogenic factors are pre-eminent.

Later clinical studies (Creak and Ini 1960) have not substantiated such hypotheses nor provided unqualified support for the original personality stereotypes. In neither of these studies were instruments such as self-rating questionnaires and projective techniques used. Klebanoff (1959) used the PARI but did not use a classification which included a distinction between early and later onset psychoses. Singer and Wynne (1963), on the basis of TAT and Rorschach responses, claimed to be able to differentiate between relatively small groups of parents of young adult schizophrenics, autistic children and childhood neurotics. The other important study is that of Pitfield and Openheim (1964) who applied parental attitude questionnaires to the mothers of Creak's psychotic children. Again this study did not provide supportive evidence of Kanner's suggestion of maternal detachment.

The MPI was selected for use as one of the few available objective tests of personality which could be rapidly administered at the time when the study was initiated.

Table 4 provides a summary of our MPI findings. The significance of differences between the two groups was tested using the 't' test.

The mothers of the late onset psychotic group were significantly more introverted than both general population females and the mothers of the infantile psychotic group. The low neuroticism and the extraversion of the mothers of the infantile psychotic group also merits emphasis. This aspect of the study again underlines the importance of conceptualisation in child psychiatry for if the two psychotic groups had been treated as homogeneous the mean differences described above would have been submerged.

Cerebral Dysfunction

A number of writers have provided evidence of cerebral dysfunction in infantile autism and other infantile psychoses. Groups of cases with broadly similar diagnostic criteria have a variable frequency of cerebral insult and/or, if not frank epilepsy, abnormal discharges in their EEG's. The specification of ascertainment criteria in such series is of crucial importance. Impreciseness and vagueness of these hamper the comparability of series and may be the explanation for questionable findings. Indeed, in childhood psychoses some investigators have excluded those cases in which there is any history or clinical evidence of organic features in an attempt to obtain a pure group. This technique, while valid in delineating a syndrome, is handicapping to subsequent etiological exercises. For these reasons we used only the

'pure' type is significantly tied to upper social class. It also underlines the well established relationship between adverse social factors and physical and intellectual malaise (Fairweather and Illsley, 1960; Illsley, 1961).

The only two behaviour features which showed associations with brain dysfunction were ritualistic behaviour and hyperkinetic behaviour. The 'pure' infantile psychotic group was significantly more ritualistic than the 'pure LOP' group. Finally the complicated infantile psychotic group was more hyperkinetic than the 'pure' infantile psychotic group at the 10% level ($p = 0.1$). The use of the term hyperkinesis in relation to infantile psychosis needs clearer definition. When present it refers to continuous movement of a desultory, non-telegical variety rather than the seemingly purposeful switching of attention and insatiable curiosity of the brain damaged hyperkinetics as has been described by Ounsted (1955). The findings of a pool of hyperkinesis within a group of young children with a high loading for brain dysfunction is not unexpected. It provides at least part explanation for a circumscribed section of behaviour manifested by infantile psychotic children.

An excess of perinatal complications have been reported in the histories of infantile psychotic children. Gittelman and Birch (1967) studied a heterogeneous group of 'schizophrenic children' and found a 35% incidence of perinatal complications. In the present study, taking equivalent items, the incidence of pregnancy and birth complications (37%) in the infantile psychotic group is broadly similar to that found by Gittelman and Birch; whereas in the late onset psychotic group this is very much lower (12%).

Table 7 provides figures for presence of brain damage in different psychotic series. As different criteria were used for rating cases as being 'brain damaged' the figures are not really comparable. Nevertheless they provide support for the suggestion of a considerable cerebral dysfunction factor being operative in infantile psychosis. It would therefore seem that part of the variance is determined by cerebral dysfunction. Epidemiological research reflecting a smaller incidence does not invalidate the importance of such discoveries but rather places them in perspective in relation to a syndrome.

The association between a cerebral dysfunction infantile psychotic group and lower social class and the inverse for the 'pure' infantile psychosis seems to elucidate the apparently contradictory findings of different series. It suggests that Kanner's autistic children tended to be of 'pure' type. This resulted in a built in social class 'error' of over-representation and a lack of evidence of cerebral dysfunction, i.e.

fits, etc. Equally, others could argue that the excessive hyperkinesis in the 'complicated' infantile psychotic group is a referral artifact.

The late onset psychotics with fits tended to have had them for many years before the onset of psychosis and the epilepsy or EEG anomalies were often localised in the temporal lobe.

TABLE 7
Comparative Evidence of Cerebral Dysfunction

Goldfarb	1961	66%
Rutter and Lockyer	1967	28% probable 25% possible
Lottor	1967	33%
Gittelman and Birch	1967	18% positive 13% at risk 75% where full data available
Kolvin P	1971a	54%
LOP		31%

In the infantile psychosis the fits were simultaneous with, or post-dated, the onset of the psychosis. There was also the group of cases with low voltage EEGs and a small group of cases with infantile spasms. In one other series (Schain and Yarnet, 1960), three cases had infantile spasms. In the present series there were four. Whatever the explanation for the high incidence of infantile spasms in this series, (such as a referral artifact) it suggests one possible pathophysiological basis for infantile psychosis. Indeed these findings suggest that the syndrome of massive spasms may bear a similar relationship to infantile psychosis as temporal lobe epilepsy bears to schizophrenia in adult patients and also to childhood psychosis of late onset. Multiple spasms are regarded as having a multi-focal origin. This is interesting in view of the fact that on occasions an autistic child has been found to be suffering from degenerative cerebral disorder (Corberi, 1926). The possibility of a minimal diffuse cortical condition or even a minimal multi-focal cortical condition in some psychotics cannot be ignored. This hypothesis is partly supported by the subsequent development of major fits in two cases in this series and in eleven of the sixty-three cases followed up at the Maudsley (Rutter and Lockyer, 1967).

The diversity of both the EEG and seizure pattern argues against a

psychotic group had a clear speech delay in terms of absence of three word phrases by the age of three.

The vast majority of infantile psychotics were not using three word phrases by the age of three years. Of the six that were under five years of age when last seen two were speaking and four were not. Therefore, of those who were speaking or at least had achieved the age of five years some 21 of the 43 were using meaningful speech. This is an underestimate of the speech potential as some children who had words at the age of five began to use meaningful phrases after five.

Pronominal reversal occurred in 14 of the 34 infantile psychotics who were using words. It was never recorded as occurring in the late onset psychotic group but this may well be due to the fact that clinical examinations took place long after the early developmental period.

Other features include a significantly greater use of meaningless words or phrases, and a significant use of echolalia among the infantile psychotics.

There was also a tendency for the infantile psychotics to show an immediate non-sustained response to unusual noises with an almost complete ignorance of common noises.

The most characteristic feature of the speech of the late onset psychotic group was the tendency to provide partial answers to questions. However, this also occurred to a significant excess in those infantile psychotics who were adequately using speech.

Table 9 shows the distribution of thought disorder in the two groups. Some consider that formal thought disorder is a central feature of schizophrenia and Fish (1962) claims that all schizophrenics will show this if their illness lasts long enough. From the table we must conclude that thought disorder is, in the main, a late onset psychotic phenomenon. The frequency of disorders of form and stream of thought in the infantile psychotic group may well be an over-estimate. The speech of these children was often very stunted and stilted, some used a sing-song voice, most were using language in a concrete way, some showed pronominal reversal and some were echolalic. In these circumstances the criteria for inclusion of infantile psychotics in these categories could never be as rigorous as they were for the late onset psychotics.

Ritualistic and Compulsive Phenomena

The data on ritualistic and compulsive phenomena has been reordered to fit in with Rutter's system (1966). Unfortunately they did not lend themselves to an exactly similar breakdown as there had been no recording of abnormal attachments. Furthermore the findings of this

TABLE 9

The Phenomenology of Childhood Psychosis B

	LOP	IP
<i>I Thought disorder</i>		
(a) Form, e.g. association	20 (60%)	2/21 (14%)
(b) Stream, e.g. blocking	20 (60%)	5/21 (23%)
(c) Possession, e.g. broadcast	7 (21%)	—
(d) Content (delusions)	19 (57%)	—
<i>II Ritualistic and compulsive phenomena</i>		
(a) Abnormal preoccupations	1 (3%)	42 (89%)*
(b) Resistance to change	5 (15%)	35 (75%)*
(c) Other obsessional phenomena	18 (54%)	33 (70%) NS
Any of items a, b or c	19 (57%)	47 (100%)*
At least one item in each of groups a, b, c	0	23 (49%)*
<i>III Hallucinations</i>		
(a) Auditory	27 (81%)	—
(b) Bodily	12 (36%)	—
(c) Visual	10 (30%)	—
Any of items a, b or c	27 (81%)	—
<i>IV Abnormal movements</i>		
(a) Spontaneous, e.g. grimace	21 (63%)	42 (89%)*
stereotypy	6 (18%)	43 (90%)*
(b) Locomotion, e.g. overactivity	3 (9%)	30 (62%)*
(c) Ambitendency (movement indecision)	20 (60%)	14 of 34 (42%) NS

* $p < 0.05$

** $p < 0.01$

table have to be interpreted with caution as one of the ascertainment criteria for the infantile psychotic group implies either a resistance to change to the appearance of stereotypy of movement. It is therefore not surprising that some 75% of the infantile psychotic group showed this feature. Nevertheless both abnormal preoccupations and resistance to change seemed to be reasonably specific to infantile psychosis and almost incidental to later onset psychosis. Ritualistic and perseverative phenomena (other obsessional phenomena) are frequent in both groups with a trend to an excess in the infantile psychotic group.

No late onset psychotic showed the behaviour designated under each of the three main categories while 23 of the infantile psychotics showed this pattern. It would therefore seem if features of all three categories are present autism is indicated.

Hallucinations

Both groups of psychotics were examined for hallucinatory phenomena, using rigorous criteria. Gazing round in a distracted manner or looking as if they were hearing voices were insufficient. In addition, at some time, the child must have given an account of hallucinatory phenomena. In only two of the forty-seven infantile psychotic cases did the attendant physician have strong suspicions that the children were hallucinating. Both these children had speech but neither could give an unequivocal account of hallucinations: Day dreaming, fantasizing, imaginary companions and the so-called hallucinatory games which are actively created by the child were excluded. The hallucinatory experiences had also to be reasonably persistent to be included.

In contrast, hallucinations occurred in most of the late onset psychotic group (Table 9). Auditory hallucinations were basic; no patients ever had visual or bodily hallucinations without them. This subject is fully discussed elsewhere (Egdell and Kolvin, 1971).

The complete absence of unequivocal hallucination in the early onset psychotics even when they are older and able to speak is of particular significance. It strongly suggests that either the infantile psychosis is unrelated to adult schizophrenia or if the underlying process is the same there are modifying ontogenetic factors which determine the type of symptomatology.

Movement Anomalies

Stereotypy and hyperactivity significantly differentiate infantile psychotics from the late onset psychotic group, while grinning occurs frequently in both groups.

Ambitendency or movement indecision is described by Fish as occurring when the patient wishes and does not wish to carry out a given action. The action used here was the offering to the patient of one's hand. An immediate handshake was rated as normal. Any indecision or stopping before shaking hands was rated as positive evidence of ambitendency. This occurred slightly more frequently in the late onset psychotics, but not at a statistically significant level.

Mood and Attitude Anomalies

Under this heading are included a series of affective and attitudinal features. No attempt has been made to group these. Some of these features are not really comparable as the very nature of infantile psychosis does not lend itself to their elicitation.

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TABLE 10
Phenomenology C

	LOP	IP
Mood and attitude		
(a) Perplexity	23 (69%)	7 of 33 (21%)**
(b) Suffering	16 (48%)	2 of 33 (6%)**
(c) Self directed aggression	1	22 (45%)**
Desultory wandering	7 (21%)	39 (81%)**
Unresponsive to pain	0	12 (25%)**

** p < 0.01

Perplexity was especially common in the early stages of late onset psychosis, and significantly differentiates the two groups. The same is true for an attitude of suffering. Self-directed aggression, on the other hand, was almost exclusively an infantile psychotic phenomenon.

Other Behavioural Phenomena

Psychotic children tend to wander around in a desultory and aimless fashion. Especially in the earlier years the infantile psychotic's wanderings are of the non-exploratory type with non-constructive activities apparently lacking goal. The late onset psychotic's wandering, though appearing aimless, is often determined by such features as a feeling of unease or distress in relation to their symptoms or a result of their delusions or the obeying of instructions given by their voices.

A quarter of the infantile psychotics were apparently unresponsive to pain or showed absence of fear in the face of real danger. This tends to suggest that pathophysiological explanations need to be sought for the apparent inexplicable crying and distress which they so often reveal in the early years of life.

Intellectual Development

The level of intelligence (see Table 11) in childhood psychosis depends on the age of onset of the psychotic process. Only 30 of the

TABLE 11
Global IQ

	LOP	IP
Under 70 or untestable	5 (16.6%)	37 (78%)
Over 70	25 (83.4%)	10 (21%)

late onset psychotics were tested psychologically but on clinical estimates none of the three untested cases would have had an IQ below 70. Nevertheless there is clear evidence of moderate intellectual deficit in the LOP and major intellectual deficit in the IP group. Our data lead us to suggest that a belief in the latent intellectual abilities of IP children has prevented even experienced psychologists committing themselves about a psychotic child's intellectual potential.

Discussion and Conclusion

It has proved possible to identify features other than the ascertainment criteria which differentiate the groups. These include:

- (i) family, genetic and social factors (Kolvin *et al.*, 1971c);
- (ii) maternal personality differences (Kolvin *et al.*, 1971d);
- (iii) evidence of cerebral dysfunction (Kolvin *et al.*, 1971e);
- (iv) phenomenological differences (Kolvin *et al.*, 1971b);
- (v) cognitive differences (Kolvin *et al.*, 1971f).

Our findings therefore substantiate both the main and subsidiary hypotheses.

Research which utilizes only behavioural criteria for diagnosis contains potential for uncovering underlying etiological factors. These factors need to be more extensively explored before they can be considered definitive. Finally a frequency analysis of the features in the two psychotic groups can be used to obtain discriminants for differential diagnosis (Kolvin *et al.*, 1971b).

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